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Application No. 10/696,104
Reply to Office Action of January 11, 2007

Docket No.: 90040-104774

AMENDMENTS TO THE CLAIMS

1-20. (Canceled)

21. (New) A system for protecting an electro-magnet from an over voltage condition, comprising:

- an electro-magnetic inductive device,
- a spark gap discharge device,
- a diode,
- a resistor,

wherein the spark gap discharge device, the diode, and the resistor are all connected in series to form a protective discharge means for protectively discharging electrical energy,

wherein the protective discharge means is connected in parallel across said electro-magnetic inductive device for preventing the electro-magnetic inductive device from developing destructively high voltage levels that occur during an abrupt change in current flow through the electro-magnetic inductive device.

22. (New) The system for protecting an electro-magnet from an over voltage condition of claim 21, further including:

a housing enclosing the spark gap discharge device, wherein the housing contains an inert gas.

23. (New) The system for protecting an electro-magnet from an over voltage condition of claim 21, wherein the resistor is a wire wound vitreous enamel power resistor.

24. (New) The system for protecting an electro-magnet from an over voltage condition of claim 21, wherein the resistor is mounted using an elastomeric material.

25. (New) The system for protecting an electro-magnet from an over voltage condition of claim 21, wherein the spark gap discharge device includes an adjustable head portion and a fixed side.

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26. (New) system for protecting an electro-magnet from an over voltage condition of claim 25, wherein at least one of the adjustable head portion and the fixed side are fabricated from metal that includes nickel or titanium.

27. (New) The system for protecting an electro-magnet from an over voltage condition of claim 22, wherein the housing includes a charge valve for adding inert gas into the housing.

28. (New) The system for protecting an electro-magnet from an over voltage condition of claim 22, wherein the housing includes a pressure sensitive purge valve that allows pressurized gas to escape from said housing when the pressure of the pressurized gas exceeds a pressure threshold.

29. (New) The system for protecting an electro-magnet from an over voltage condition of claim 22, wherein the housing includes a pressure gauge for measuring the pressure within the housing.

30. (New) The system for protecting an electro-magnet from an over voltage condition of claim 22, wherein the housing is mechanically mounted directly on the electro-magnetic inductive device.

31. (New) The system for protecting an electro-magnet from an over voltage condition of claim 22, wherein the inert gas is nitrogen.

32. (New) The system for protecting an electro-magnet from an over voltage condition of claim 22, wherein the inert gas exerts a pressure within said housing in the range of 5-15 pounds.

33. (New) A system for protecting a device from a high voltage power supply open circuit comprising:

an inductive device;

a spark gap;

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a diode connected in series with the spark gap that define an inductive discharge device, wherein the inductive discharge device is connected across terminals of the inductive device;
a power supply that energizes the inductive device, wherein the inductive device is operable to either be
energized by the power supply so that the diode is reversed-biased to prevent current flow through the inductive discharge device, and
energized so that the diode is forward-biased to permit energy stored by the inductive discharge device to be discharged by the spark gap when the inductive device sees an open circuit across the power supply.

34. (New) The system according to claim 33 further comprising:
a resistance in series with the diode and the spark gap.

35. (New) The system according to claim 33 wherein the resistance comprises at least two resistors connected in parallel.

36. (New) The system according to claim 33 further comprising:
a housing enclosing the spark gap, the housing filled with an inert gas; and
a charge valve operable to allow insertion of the inert gas into the housing.

37. (New) The system according to claim 36 further comprising:
a purge valve operable to allow at least one of venting and removal of the inert gas from the housing.

38. (New) The system according to claim 36 wherein the inductive device is an electromagnet.

39. (New) The system according to claim 36 further including:
a purge valve extending into the housing, the purge valve operable to allow at least one of venting and removal of the inert gas from the housing.

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40. (New) The system according to claim 36 further including:
an air pressure gauge extending into the housing, the air pressure gauge operable to
measure the pressure of the inert gas.